BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

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SOUTHERN CALIFORNIA GAS COMPANY'S (U 904 G) COMMENTS ON ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENT ON STAFF PROPOSAL FOR BUILDING DECARBONIZATION PILOTS

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August 13, 2019

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Pursuant to Administrative Law Judge's Ruling Seeking Comment on Staff Proposal for Building Decarbonization Pilots (Staff Proposal Ruling), Southern California Gas Company (SoCalGas) submits the following opening comments.

I. INTRODUCTION

SoCalGas appreciates that the California Public Utilities Commission (CPUC) and California Energy Commission (CEC) hosted a public workshop on the Staff Proposal, particularly to allow for public questions and comments. SoCalGas is extremely concerned the Staff Proposal excludes all gas technologies and fuels, including solar thermal, renewable natural gas (RNG) and hydrogen, from the Building Initiative for Low Emissions Development (BUILD) and Technology and Equipment for Clean Heating (TECH) pilots. This will result in a missed opportunity to evaluate the effectiveness and potential scale of *all* available technologies and fuels which will be needed to combat greenhouse gas (GHG) emissions. Underscoring this, in recent comments to the California Energy Commission,[1] Lawrence Livermore National

[1] LLNL comments to the California Energy Commission on June 21, 2019 Re: The Natural Gas Infrastructure and Decarbonization Targets (19-MISC-03). Examples: Page 1, "LLNL believes that there may be important benefits to the state from achieving a low- or zero-carbon gas system. California's economic and climate goals may be best served by a combination of electrification and dramatic reductions in the carbon intensity of the existing gas network." Page 7, "…factors other than cost may affect complete electrification in a suitable timeframe. While new buildings are most easily electrified, current buildings are reliant on natural gas and would require replacement of existing equipment for electrification. Residential natural gas equipment can have a lifetime of decades. Replacing it with electrically powered equipment may also require electrical wiring upgrades. Also, consumer choice may

Laboratory (LLNL) expressed concerns with focusing solely on electrification while ignoring the potential for renewable gas to achieve decarbonization goals, including in the building and residential sector. Because gas can and should be part of meeting the State's climate change goals, SoCalGas' comments focus on the importance of including gas technologies in the BUILD and TECH programs. SoCalGas further offers comments and questions in response to the workshop.

Questions 8 and 11 in the Staff Proposal Ruling ask if the technology eligibility criteria for the BUILD and TECH programs is reasonable.[2] Below are comments specific to these questions.

II. SOCALGAS COMMENTS ON SENATE BILL 1477 FRAMEWORK

1. All Emissions Reduction Technologies, Including Natural Gas, Should Be Included in the Senate Bill (SB) 1477 BUILD and TECH Programs.

SoCalGas supports California's broader decarbonization efforts and has long been a leader in developing emerging technology and energy efficiency (EE) programs that deliver meaningful GHG emissions reductions. We are proud of the advances we have made through our programs and partnerships with equipment manufacturers and our customers. We recognize and are prepared to manage the challenges presented in order to achieve mandated GHG emissions reduction targets by 2030 and carbon neutrality by 2045. In order to achieve these ambitious goals, SoCalGas, like Lawrence Livermore National Laboratory, supports implementation of a multifaceted approach that supports resiliency, reliability, customer choice, and affordability. Unfortunately, those narrowly focused on all-electrification appear to have on blinders that prevent them from recognizing other, and potentially better, solutions that achieve

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affect the pace and degree of electrification: while some consumers may not favor gas over electric water heaters, preference for gas over electric cooking stoves may be particularly strong. Furthermore, until electricity is completely decarbonized (current state target is 2045), full electrification of buildings does not reduce greenhouse gas emissions to zero. The emissions from current residential natural gas demand could be significantly reduced while maintaining current residential infrastructure by blending RNG into the natural gas supply. Publicly available at: https://efiling.energy.ca.gov/GetDocument.aspx?tn=228811&DocumentContentId=60143

[2] 8. Comment on whether the Staff Proposal's analysis and recommendations for the BUILD program's technology eligibility criteria, process for evaluating new technologies, guidelines and evaluation metrics, and criteria for scoring and selecting projects are reasonable.
11. Comment on whether the Staff Proposal's analysis and recommendations for the TECH program's technology eligibility criteria, process for evaluating new technologies, guidelines and evaluation metrics, and criteria for scoring and selecting projects are reasonable

the same goals, albeit *at a reduced cost*. Similarly, the Staff Proposal falls short as a viable framework to accomplish these important tasks. Foremost, the Staff Proposal does not effectuate the intent of the California Legislature. SB 1477 is very plainly an emissions reduction bill to incentivize the adoption of technologies that reduce emissions relative to existing code baselines. Given this uncontested clarity, the Staff Proposal should be modified to comply with the law and include *all* technologies, of *all* fuels, that reduce emissions relative to existing codes.

The Staff Proposal purports to seek to be a pilot to test its stated programmatic approaches. However, as noted at the workshop, there already are other existing programs, including those that promote all-electric home building, that provide significant incentives for electric heat pump technology in other jurisdictions. And, in each case, there is only marginal uptake from customers. A pilot program should test something new. SoCalGas has outlined a new approach to use highly efficient lower-emission technologies combined with use of scalable RNG as a cost-effective and viable approach to achieve California's goals while maintaining customer choice, enhancing grid reliability and resiliency, and maintaining an affordable energy source.

a. The Staff Proposal Should Include Solar Thermal Gas Technologies, RNG, and Hydrogen

The Staff Proposal is inconsistent with SB 1477 in that it omits the comprehensive inclusion of solar thermal technologies. SB 1477 specifically references solar thermal as an eligible measure; however, the Staff Proposal, without basis, limits funding availability solely to solar thermal with electric backup. Such a short-sighted and narrow interpretation of SB 1477 unnecessarily limits the impact of this program overall. California and SoCalGas historically have been supporters of solar thermal technologies with natural gas backup through the California Solar Initiative Thermal (CSI Thermal) program. This program has been extremely successful, resulting in the installation of nearly 7,200 solar systems in the SoCalGas service territory, which in turn has resulted in more than 4.4 million therms in energy savings annually. However, the CSI Thermal program is set to sunset on July 31, 2020 as a result of Assembly Bill (AB) 797, and the current strong demand for the program will likely exhaust available funds before the program sunsets. SoCalGas believes its solar thermal program can and should play a significant role in a decarbonized future. SoCalGas requests that the Staff Proposal be modified to included solar thermal applications with natural gas backup and that $5 million of the overall

TECH program be allocated to the CSI Thermal program administrators initially to supplement the current lack of funding, and then augment additional funding beyond July 31, 2020. SoCalGas believes this strategy will result in meaningful, long-term emissions reductions and energy savings to support California's decarbonization goals.

The Staff Proposal Ruling notes the "Commission designed this OIR to be inclusive of any alternatives that could lead to the reduction of (GHG) emissions associated with energy use in buildings." However, the Staff Proposal fails to be inclusive of *all* effective alternatives. The Staff Proposal not only explicitly excludes solar thermal with natural gas backup, but it also rejects the use of RNG with high efficiency natural gas equipment, both of which offer technologies and fuels that can have significant and immediate effects on the reduction of GHGs. The Staff Proposal should be amended to be consistent with the intent of this proceeding, i.e., to allow for creative solutions utilizing all available technologies and fuel sources that can provide the GHG reductions required by SB 1477.

The primary reason staff is focused on electrification is due to the expected lower carbon intensity of the electric grid. As SoCalGas stated in its opening comments in this proceeding, we are pursuing a path to reduce the carbon intensity of natural gas by establishing protocols and standards for RNG and hydrogen to be delivered through our pipelines. The SB 1477 programs should be structured to allow for these and other future opportunities to achieve emissions reductions from all fuel sources. For example, a prime contractor for the BUILD program should be allowed to provide proposals that would utilize RNG or hydrogen fuel cells, among other technologies, to achieve the desired reductions. The programs should identify a target and then let technologies compete to provide the best solution at the lowest cost and with least disruption to customers' daily lives.

As noted in a recent study by former United States Secretary of Energy Dr. Ernest Moniz,[3] to meet California's aggressive 2030 low-carbon energy goals, we must utilize *all* energy infrastructure to achieve our goals and must maintain a *diverse* portfolio of energy options. Dr. Peridas of Lawrence Livermore National Laboratory noted a similar sentiment in his June 21, 2019 letter to the CEC on "The Natural Gas Infrastructure and Decarbonization

[3] EFI, *Optionality, Flexibility, & Innovation. Pathways for Deep Decarbonization in California.* Full report available at: https://energyfuturesinitiative.org/s/EFI_CA_Decarbonization_Full-b3at.pdf

Targets." He concluded "there are up-sides to maintaining existing natural gas infrastructure that cut across many sectors" and, even when there are electrification options, there "are merits to allow multiple lines of attack."[4]

Indeed, we are seeing a move to include RNG in the portfolio of solutions being adopted in other parts of the country and the world. Over the past year, Nevada, Oregon, and Washington all adopted bills that will advance RNG usage in buildings. In Europe, a number of countries have adopted policies and regulations to support use of RNG and hydrogen for heating buildings. Further descriptions of these examples can be found in Attachment A to these comments. California should not adopt narrow policies and programs from the outset that will exclude similar opportunities to reduce GHG emissions from buildings.

b. The Cost of All-Electric Homes versus Mixed-Fuel Homes

When compared to the cost of an all-electric home, the savings realized by allowing use of natural gas can be substantial. Even excluding the costs associated with electric appliance conversion, according to a recent study by Navigant Consulting on behalf of the California Building Industry Association (CBIA),[5] the total average annual energy bills for a typical mixed fuel (i.e., gas and electric) home in California is up to $387 less than an all-electric home. Furthermore, the study found that retrofitting existing homes can cost residents up to $7,345, including the costs associated with upgrading electrical systems and the incremental cost of electric heat pump technologies. The study indicated that the combined cost of appliance conversion (assuming 15-year appliance lifespan and cost amortization), and the increased electricity use (based on local utility rates) results in a household cost increase of up to $1,302 per year for an all-electric home. While the study results show a potential net savings for some all-electric new construction home scenarios in the future, it clearly shows for the vast majority of existing homes in California, across various climate zones and utility service areas, most homeowners would be subject to substantial increased costs in energy bills associated with electrification. The Navigant model did not include the unknown additional costs associated

[4] LLNL comments to the California Energy Commission on June 21, 2019 Re: The Natural Gas Infrastructure and Decarbonization Targets (19-MISC-03). https://efiling.energy.ca.gov/GetDocument.aspx?tn=228811&DocumentContentId=60143

[5] *Impacts of Residential Appliance Electrification*, prepared by Navigant Consulting for the California Building Industry Association. August 2018.

with electrical system impacts and mitigation related to wildfire issues, as well as the currently unknown costs required for upgrading the grid to meet the needs of smart grid improvement, including Electric Vehicle (EV) charging and distributed generation and storage technologies. Additional analysis is needed to fully understand the impact of Time of Use (TOU) electric rates, the fully loaded costs of electric grid maintenance and upgrades, the changing landscape of appliance efficiency and performance, and the direct customer costs associated with utility line extension and installation.

i. Using EE Will Support Reaching Decarbonization Goals, and RNG and Hydrogen Are Necessary Technologies to Realize Long-Term Impacts

The presentation from Pacific Gas and Electric Company's (PG&E) Advanced Energy Rebuild program implementer illustrates the high cost of pursuing a singular, all-electric pathway. The costs are high both from an emissions-reduction perspective and an energy efficiency perspective. The program currently costs approximately $2,900 per ton of CO2 savings,[6] compared to approximately $165 per ton for high efficiency technologies[7] and $46-260/mtCO2e per ton with RNG. Such a massive disparity not only does a disservice to California and its ratepayers; it furthermore is inconsistent with the Staff Proposal's stated guiding principle of cost-effectiveness. Energy efficiency continues to be the most cost-effective solution to achieving California's energy saving and emissions reduction goals. SoCalGas is the nation's leader in natural gas energy efficiency. The BUILD and TECH programs should seek to leverage SoCalGas' accomplishments and partner with it to further the reach, success, and impacts of our common goals.

The Staff Proposal errs by excluding natural gas technologies on the basis that there already are existing energy efficiency programs and funding for natural gas technologies. This is erroneous because the intent of SB 1477 is to reduce emissions, while this is not the primary driver of existing energy efficiency programs. For example, there are boiler technologies that save emissions, but are marginally energy efficient. As a result, they are not subject to energy

[6] "Post-Fire Construction: Lessons from the *Advanced Energy Rebuild* Program." Presentation by Nic Dunfee from TRC at the July 30, 2019 CPUC Workshop. $985,000 Total incentives reserved divided by 340 tons of CO2 of enrolled GHG savings equals $2,897/ton of CO2. Publicly available at: https://www.cpuc.ca.gov/General.aspx?id=6442462146

[7] SoCalGas' 2019 Annual Energy Efficiency Report.

efficiency rebates, but nevertheless would be good candidates for BUILD and TECH incentives. The Staff Proposal's omission of these opportunities will jeopardize program effectiveness.

III. SoCalGas Urges Transparent Metrics to Enable Successful Program Delivery

Question 13 in the Staff Proposal ruling asks if the list of metrics and sub-metrics are appropriate.[8]

SoCalGas generally agrees with the guiding principles and proposed metrics set forth in the Staff Proposal. Specifically, the Staff Proposal focuses on two key goals: cost-effectiveness and utility bill savings. SoCalGas agrees on the importance of these two critical areas as thresholds to guide participation in these programs and to ensure sufficient ratepayer protection. However, SoCalGas notes that these metrics are not congruent with the elements of the Staff Proposal. As stated herein, the inclusion of natural gas technologies and RNG could result in a more cost-effective solution for customers and reduce utility bills. If the numbers presented by PG&E in its Advanced Energy Rebuild program are indicative of an electric-only construction program, then it will not meet the objectives and metrics specified in the Staff Proposal. The CPUC and CEC should ensure strict adherence to its guiding principles and metrics and redesign the BUILD and TECH programs to meet these objectives.

In addition to the two thematic principles and metrics above, the Staff Proposal should include impacts on the energy systems, including any infrastructure improvements that may be needed. It is also important that there is full transparency on how the metrics are calculated, including all inputs. Those should be shared with stakeholders with sufficient time and process provided to review and provide input. It is critical to fully understand the complete upstream and downstream impacts that these policy changes and programs will produce.

IV. Southern California Edison Should Not Be Involved in the Contracting Process

Question 9 in the Staff Proposal Ruling asks if the mechanism for selecting a program administrator for the TECH program is reasonable.[9]

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[8] 13. Other Questions: a. The staff proposal includes a list of GHG metrics and sub-metrics to measure the success of the BUILD and TECH programs. Are these metrics appropriate? Why or why not? Are there any additional or different metrics that should be considered? Why or why not?

[9] 9. Is the proposed mechanism for selecting a program administer for the TECH program reasonable?

Southern California Edison (SCE) should neither lead the solicitation for the TECH Program nor be the eventual contract owner of the selected bidder as this would clearly result in a conflict of interest. Regardless of the impetus for building electrification, the fact is that it will result in an increase in electric load. This factual load building exercise will benefit electric utilities, namely SCE, as the largest electric-only utility in California.

The building of significant electric infrastructure to meet the increased load clearly has a strategic advantage for electric utilities over the long-run. SCE's rate of return is directly connected to the amount spent on infrastructure. SCE should not lead a solicitation from which they have much to gain. The inherent conflict is exacerbated all the more by the fact that the CPUC and CEC would have *gas ratepayers* fund the increase in electric load through gas C&T funds, which ultimately lead to existing and new *electric ratepayers* bearing the costs of increased infrastructure upgrades and maintenance costs. As a result, an electric utility can increase its number of customers and corresponding load, at no cost to it, leading to an increase in shareholder profits—all borne on the backs of existing gas ratepayers. This clearly poses a conflict of interest for SCE as well as issues of inappropriate ratepayer subsidization. As such, SCE should not be permitted to conduct the solicitation and contracting duties recommended in the Staff Proposal.

V. SoCalGas Responses to Specific Workshop Presentations and Comments

Question 14 in the Staff Proposal Ruling states that parties are encouraged to comment on the discussion at the workshop.[10]

1. Unsupported Health Claims (i.e., Asthma) Attributed to Natural Gas

During public comment, there were specious claims made by electrification advocates that natural gas appliances adversely impact indoor air quality and cause childhood asthma. In fact, there is significant evidence already provided by SoCalGas in our comment letter on the April 8 Decarbonization Workshop that refutes these inaccurate claims about indoor air quality.

[10] 14. Transcripts: the upcoming July 30, 2019 workshop will be transcribed. Therefore, parties are encouraged to comment on the discussion transcribed at the workshop.

As noted in our April 22, 2019 letter, studies sponsored by CEC[11] and CARB[12] note the primary factor for high home air pollutant levels is poor or improper ventilation of equipment. In relation to cooking, the emissions from the food, not the heat source, are the predominant source of particulate matter, which has been linked to asthma.

2. Advance Energy Rebuild Program - SoCalGas Requests Additional Follow-Up Data from Program Presentation

In response to the presentation made by PG&E, SoCalGas made some observations and requests for additional follow-up data. SoCalGas applauds PG&E for the speed with which it was able to launch a fire rebuild program after the immense damage caused by wildfires in northern California. However, SoCalGas notes that the number of all-electric home rebuilds that participated in the program is noticeably small compared to the number of overall permits pulled. The presenter from PG&E's program implementer was correct: customers want the choice to use natural gas appliances. This is consistent with a study released last year from CBIA that said only 10 percent of respondents would purchase a home with only electric appliances.[13] The CPUC and CEC should take note of the lessons learned from PG&E's recent experience and ensure that customer choice is a critical component of the BUILD and TECH programs insomuch that highly efficient and lower-emission natural gas technologies are included to achieve decarbonization objectives. This will serve to give customers the options they clearly want while simultaneously achieving California's broader goals.

Specific to the presentation from PG&E's implementer, SoCalGas requests an analysis of the 28 all-electric homes, i.e., were the homes all-electric to begin with, were they fueled by propane, by natural gas, etc. Furthermore, the income levels of those customers who participated in the rebate program should be noted and integrated into the analysis. Presumably the home fuel statistics will result in a combination of all three use cases, which will result in an even greater statistical reduction in number of customers willing to convert from gas to electric appliances and homes. Also it is important to understand income levels of customers to

[11] California Energy Commission. October 2017. *Emissions, Indoor Air Quality Impacts, and Mitigation of Air Pollutants from Natural Gas Appliances.* Publicly available at: http://www.energy.ca.gov/2017publications/CEC-500-2017-034/CEC-500-2017-034.pdf

[12] California Air Resources Board. January 2006. *Residential Cook Exposure Study Final Report.* Publicly available at: https://www.arb.ca.gov/research/indoor/cooking/cooking.htm

[13] Competitive Edge prepared for CBIA, "California Natural Gas Poll," April 17, 2018.

determine whether the target customer is wealthier, on average, in order to have the disposable income needed to facilitate the cost to switch appliances and the corresponding increase in electric bills. Given the low-income and disadvantaged community targets mandated by SB 1477, this data will be useful to develop a program that does not burden a large number of customers with higher utility bills.

SoCalGas also requests additional details on the costs shown in the PG&E presentation. Specifically, how much in incentives are provided to customers who participate in this program, and what are the corresponding construction costs associated with the homes built. It would also be helpful to understand the utility bill impacts of those who participated in this program by comparing previous utility bills to current utility bills. A complete understanding of the upstream and downstream economics is critically important for policymakers to understand the impact of these programs on customers.

3. Ratepayer Dollars Should Not Be Used to Market Specific Products

SoCalGas agrees with public comments made that BUILD and TECH funds should not be used to fund the marketing of specific consumer brands and products. This is not an appropriate use of ratepayer funds. Similar to the use of energy efficiency ratepayer funds, there is a higher threshold that governs the utilization of these funds. For example, the best practice in the CPUC's demand-side management programs, like energy efficiency, is to be manufacture-neutral and to focus on technologies, not brands. This prevents ratepayer money from being used to pick winners. This long-standing best practice should extend to the SB 1477 programs, and marketing campaigns or incentives available should be on emissions-reduction and/or energy efficient technologies, not on specific brands.

VI. CONCLUSION

SoCalGas thanks the CPUC and CEC for hosting a public workshop and allowing comments on the Staff Proposal. As noted above, in its current form, the Staff Proposal unnecessarily wastes an opportunity to test and learn from all technologies that are available to combat building decarbonization through a pilot program. Especially in light of studies and recommendations by Lawrence Livermore National Laboratory and others, we urge the CPUC and CEC to rethink how best (i.e., effectively, cost-effectively, and quickly) to reach the ultimate goal of lowering GHG emissions, and also remember that one-third of California's population is considered low-income.

Cost impacts are an important consideration for families and commercial operators that may not have the disposable income to adapt to new requirements easily. Therefore, using all tools available that are *least costly* to the general population is of utmost importance. We look forward to collaborating further in this proceeding and hope to have the opportunity to provide solutions inclusive of RNG, hydrogen, and ultra-efficient natural gas to achieve our mutual climate goals.

Respectfully submitted on behalf of SoCalGas,

By: ***/s/ Avisha A. Patel***
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ATTACHMENT A

- **Washington**
    - **HB 2580 (2018):** Requires the Department of Commerce to explore development of voluntary gas quality standards for the injection of renewable natural gas (could include methane hydrogen) into the natural gas pipeline system. Reinstates and expands tax incentives for certain landfills and anaerobic digesters to stimulate investment in biogas capture and conditioning, compression, nutrient recovery, and use of renewable natural gas for heating, electricity generation, and transportation fuel – ***Signed by Governor on 3/22/18***
    - **HB 1257 (2019):** Among other measures aimed at reducing emissions from buildings. requires the utilities and transportation commission to establish a schedule of annual minimum renewable natural gas acquisition targets for each gas company – ***Signed by Governor on 5/07/19***
    - **SB 5588 (2019):** Authorizes public utility districts to produce, distribute, and sell renewable hydrogen – ***Signed by Governor on 4/17/19***
- **Utah**
    - **HB 109 (2019):** A plant or facility that stores, produces, or distributes hydrogen for use as a fuel for vehicles, for electrical generation, or for industrial use is now eligible for funding from the state's Permanent Community Impact Fund. Companies involved in the construction of these plants and facilities are now also eligible for tax credits - ***Signed by Governor on 4/02/19***
- **Nevada**
    - **SB 154 (2019):** This bill requires the Public Utilities Commission of Nevada to adopt regulations authorizing a public utility which purchases natural gas for resale to engage in renewable energy activities and to recover all reasonable and prudent costs associated with the public utility's participation in a renewable natural gas (including electrolytic hydrogen) activity which provides certain environmental benefits and has been approved by the Commission. This bill also requires a public utility which purchases natural gas for resale to attempt to meet certain goals for incorporating renewable natural gas into its gas supply portfolio – ***Signed by Governor on 5/14/19***
- **Oregon**
    - **SB 98 (2019):** Requires Public Utility Commission to adopt by rule renewable natural gas program for natural gas utilities to recover prudently incurred qualified investments in meeting certain targets for including renewable natural gas (including methanated hydrogen and hydrogen from renewable resources) in gas purchases for distribution to retail natural gas customers – ***Signed by Governor on 7/15/19***

- **Town of Paradise, CA**

    - **AB 178 (2019):** This bill exempts any residential construction intended to "repair, restore, or replace" a residential building that was damaged or destroyed as a result of a disaster in an area in which the Governor has declared a state of emergency from the state's recently adopted requirements for solar photovoltaic systems until January 1, 2023 - ***Active, in Senate Appropriations Committee (7/02/19)***

- **GRTGAZ & Engie**

    - The objective for renewable gas to account for 10% of gas consumption by 2030, defined in the French Energy Code, was set with a view to limiting global warming to 2°C by 2050. – A producer is guaranteed to sell the biomethane produced by its installation to a natural gas supplier at a rate fixed by Decree for a period of 15 years. The producer will benefit from a purchase price of between €46 and €139/MWh, compared with an average of €99/MWh in 2016. The price depends on the production facility's size, referred to as the maximum capacity of biomethane production (expressed in Nm3 /h) and the nature of the waste or organic matter being treated. For anaerobic digestion facilities, purchase prices are made up of a reference tariff and an "input" premium. According to Decree No. 2016-411 of 7 April 2016 on the various adaptation measures in the gas sector, the State may use tenders in addition to feed-in tariffs to support the biomethane injection sector. The Decree contains stipulations governing the terms and conditions of these tenders. – http://www.grtgaz.com/fileadmin/plaquettes/en/2018/Overview-Renewable-Gas-2017.pdf

- **Denmark**

    - "Denmark alone, a country of 5.8 million people, has more than 160 biogas systems. For a period last summer, 18 percent of the gas consumed in Denmark came from RNG produced by its anaerobic digesters. Flush with their success, Danish bioenergy firms estimate it will be feasible to fully replace the country's natural gas with renewable natural gas within 20 years." - https://e360.yale.edu/features/could-renewable-natural-gas-be-the-next-big-thing-in-green-energy